Talking Points for
The Hon. GEORGE E. BROWN, JR.
before the Committee of the Whole

19 May 1994

In defense of MR. BROWN'S Amendment to HR 4301: NATIONAL DEFENSE AUTHORIZATION ACT FOR FISCAL YEAR 1995.

QUESTION: This report language already provides for such a study. Why duplicate it?

ANSWER: We both agree that the report SHOULD contain this language. The only question then is, does the report language ACTUALLY contain these provisions? I say that it does not contain it now, therefore let us resolve our difference of opinion by adding this reasonable and specific language.

QUESTION: Advanced EHF communication is considered "very sporty technology." Why not build all four Milstar IIs as planned, and wait till 2006 to deploy Milstar III?

ANSWER: 2006 is TWELVE YEARS away--TWO ENTIRE computer generations. The baseline design of Milstar costs far too much. [This misallocation of resources is bound to impact other more deserving areas of the federal budget, even if indirectly. I fully support the language of

Section 234, which very commendably seeks to redress institutional disincentives to exercise economy.]

[Partly, the high cost is due to the nuclear warfighting requirement which Milstar III won't have, and partly because of the extremely expensive Titan IV launcher. We should get enough practice with the EHF technology building two billion-dollar plus satellites over the next five years to learn how to improve it. Building two more identical satellites at a cost of over two billion dollars isn't likely to gain any marginal increase in knowledge.] In addition, the SecDef already supports an acceleration of Milstar III; the question then becomes one of technical risk, hence operational risk. I think that this risk is less than some of my esteemed colleagues think it is. The purpose of my amendment, a tightly focused technology assessment, is to find out.

QUESTION: You say Milstar can't handle the protected traffic forecasted for 2003? Why don't other satellites have these features?

ANSWER: Correct. First, DoD has forecast a need for 13 billion bits per second of capacity by 2003, of which one billion bits/second is not routine, assuming two medium regional conflicts. Of this, over four hundred million bits must be carried by protected satellite links. The baseline Milstar constellation can carry, AT MOST, less than half this traffic. Note also that, historically, traffic forecasts INCREASE the closer you get to the predicted year. Second, the EHF microwave spectrum has been little used till now, and other satellites are not

intended to deal with intense jamming or covert operations.

QUESTION: Won't operating without a full constellation of Milstars endanger military forces?

ANSWER: Not necessarily. As you know, we often operate without two U. S. geostationary weather satellites for which there ALREADY is a validated military requirement.

QUESTION: Isn't the real goal to kill Milstar?

ANSWER: No, I support the Milstar mission of secure communication and national defense. This amendment, which is very cautious, should not be construed as canceling the Milstar program in this or any other year.

[It may be that the study determines that there is no military threat to the United States from [such] Western Hemisphere powers [as Guatemala or Canada]. If so, Congress may want to review the baseline deployment. Even if satellites #5 and #6 were canceled, there would still be worldwide coverage at low data rates until the advanced Milstar III came on line.]

Union Calendar No. 278

An Amendment (revised)

103D CONGRESS

to

2D SESSION

H.R.4301

NATIONAL DEFENSE AUTHORIZATION ACT FOR FISCAL YEAR 1995

IN THE HOUSE OF REPRESENTATIVES

May 19, 1994

MR. BROWN introduced the following amendment;

INSERT after line 13, Sec. 234, page 45:

(4) a technology assessment plan that thoroughly examines a substantial acceleration in the development, and construction, to support deployment of the advanced technology MILSTAR III constellation as early as 2001; and

(5) a reassessment of the current acquisition plan in the context of subparagraphs (2) and (4) above.

Union Calendar No. 278

An Amendment

103D CONGRESS

to

2D SESSION

H.R.4301

IN THE HOUSE OF REPRESENTATIVES

May 16, 1994

MR. BROWN introduced the following amendment;

INSERT after line 13, Sec. 234, page 45:

(4) a technology assessment plan that thoroughly examines a substantial acceleration in the development, construction, and deployment of the advanced technology MILSTAR III constellation, in such a way as to minimize or eliminate a gap in medium data rate coverage of the globe should the fifth and sixth satellites of the planned configuration not be deployed starting in 2001; and

(5) a review of options for eliminating the fifth and sixth satellites from the planned configuration by supporting the communications requirements described in subparagraph (1) above with commercial services, terrestrial lines, or other national communications assets prior to the deployment of the advanced technology MILSTAR III constellation.

to support deployment as early as 2001; and

(5) a reassessment of the current acquisition plan in the context of subgraphs (2) and (4) above.

Union Calendar No. 278

AMEND

An Amendment

103D CONGRESS

to

2D SESSION

H.R.4301

NATIONAL DEFENSE AUTHORIZATION ACT FOR FISCAL YEAR 1995

IN THE HOUSE OF REPRESENTATIVES

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(5) a review of options for eliminating the fifth and sixth satellites from the planned configuration by supporting the communications requirements described in subparagraph (1) above with commercial services, terrestrial lines, or other national communications assets prior to the deployment of the advanced technology MILSTAR III constellation.

BROWN Amendment to HR 4301: NATIONAL DEFENSE AUTHORIZATION ACT FOR FISCAL YEAR 1995.

Summary (revised)

- This amendment directs the Secretary of Defense to expand the study ***already provided for*** in Section 234 of the Defense Authorization bill.

- This Amendment provides for:

  1) developing a technology assessment plan which would permit the aggressive acceleration of the deployment of the newer technology, smaller, cheaper MILSTAR III by five years to 2001; and

  2) reassessing the current acquisition plan (buying the last two Milstar IIs) based on the results of:
     - the HASC-required study of "alternative and innovative ways of meeting those [military communications] requirements" with commercial services, terrestrial lines, or other national assets, and
     - the accelerated Milstar III deployment that I have called for in my amendment.

- This amendment ***does not*** direct that MILSTAR II or any other part of MILSTAR be canceled this year.

BROWN Amendment to HR 4301: NATIONAL DEFENSE AUTHORIZATION ACT FOR FISCAL YEAR 1995.

Summary

- This amendment directs the Secretary of Defense to expand the study ***already provided for*** in Section 234 of today's authorization bill.

- Amendment provides for:

  1) developing a technology assessment plan which would permit the aggressive acceleration of the deployment of MILSTAR III by five years to 2001; and,

  2) determining ways to cover any brief gaps in data coverage that might occur after 2002 with commercial services, terrestrial lines, or other national assets.

- This amendment ***does not*** direct that MILSTAR II or any other part of MILSTAR be canceled this year.

Statement of
The Hon. GEORGE E. BROWN, JR.
before the Committee of the Whole

18 May 1994

Floor consideration of MR. BROWN'S Amendment to HR 4301: NATIONAL DEFENSE AUTHORIZATION ACT FOR FISCAL YEAR 1995.

{At the appropriate time, stand and seek recognition. The CHAIRMAN will ask, "For what reason does the gentleman rise?"}

MR. BROWN: Mr. Chairman, I have an amendment at the desk.

{CHAIRMAN: The gentleman is recognized for ___ minute(s) for explanation of the amendment.}

Statement

MR. BROWN: Mr. Chairman, I would like to briefly explain the amendment I am proposing today. As you know, MILSTAR is the largest, most complex, most expensive communication satellite in history. MILSTAR was first conceived during the height of the Cold War 20 years ago. It was designed to provide secure, survivable communications between the National Command Authority and strategic forces during a nuclear war. No other communication satellite in the sky has all MILSTAR's features, or, frankly, needs to. Originally expected to cost a total of $40.7 billion, the program has been

restructured three times since, but it is still projected to cost over $20 billion to complete.

Mr. Chairman, my initial intention was to cancel this relic of the Cold War altogether. But I have come to see that the MILSTAR program does serve a valid purpose not available in any other system, although not necessarily the way it is presently structured. Still, there is no reason to adhere slavishly to plans developed when the world was radically different than it is today. I believe Americans can do much better than a marginal cost of ***over one billion dollars*** to build and launch a satellite, which sum does not even include the huge non-recurring development costs. Moreover, formerly ironclad requirements have a way of evaporating overnight lately. I allude to the White House's recently announced policy shift on polar-orbiting weather satellites.

[About $10 billion has been spent on the MILSTAR program so far. The first satellite in the series, called MILSTAR I, was finally launched on February 7 this year after being delayed since ***1987***. The second MILSTAR I is scheduled to go up next year. Two redesigned MILSTAR IIs have been contracted to be built and launched by 2000. MILSTAR III is a cheaper, lightweight, advanced technology satellite with greater data capability that can be orbited by a much less expensive medium launch vehicle. First deployment is scheduled about 2006.]

Rather than waste the precious resources expended so far, Mr. Chairman, this amendment directs the Secretary of Defense to merely expand upon a study ***already provided for*** in Section 234 of today's authorization bill. Specifically, this amendment provides for the Secretary to extend the study by: 1) developing a technology assessment plan which aggressively accelerates the deployment of MILSTAR III by five years to 2001; and, 2) determining ways to cover any brief gaps in data coverage that might occur after 2002 with commercial services, terrestrial lines, or other national assets. This amendment ***does not*** direct that MILSTAR II or any other part of MILSTAR be canceled precipitously this year, merely that DoD thoroughly explore alternatives that new technology is continually making available.

Obviously, today's budgetary need to do more with less implies that those forces we do maintain will require more command and control, which in turn demands more communication. In light of the huge signal traffic during the recent Persian Gulf conflict, and forecasts since then, the present communication ability is obviously inadequate.

Thus, instead of canceling the program outright, I believe it is prudent to consider alternative ways to structure MILSTAR by incorporating new technology and not locking the taxpayers into a possibly obsolete architecture. Our ultimate goal should be a cost effective, robust, convergent, civil-military space communications system that meets

legitimate national security requirements. To their credit, the Pentagon has recognized the need for convergence among all three of their satellite constellations by early in the next decade and will be studying the matter this year.

As you know, the GAO recommended that the most opportune time to insert advanced technology was after deployment of satellite #4 in the year 2000, and that DoD study this option. The present language in the bill under consideration today provides the Secretary of Defense with discretion in allocating funds to either long-lead time items for satellites #5 and #6 in the present configuration, or to accelerate MILSTAR III development further. This amendment in no way invalidates that language. My sole purpose is to provide ***direction*** rather than ***discretion*** in this process.

Mr. Chairman, I would point out to my fellow Members that satellites #5 and #6 have not even been contracted for yet, nor have their extremely expensive Titan IV launchers been purchased. Furthermore, there will be a gap in global coverage at medium data rates until the year 2002 even under the Pentagon's present plan. Finally, my colleagues [on both sides of the aisle] should note the MILSTAR constellation as presently configured will not satisfy the Pentagon's own forecasts for protected traffic ten years from now. Technology acceleration is ***absolutely*** necessary.

If the follow-on MILSTAR III ***can*** be deployed around 2001 via aggressive technology development, judicious placement of the two Milstar Is and two Milstar IIs, and bridging brief data shortages, if any, with commercial or other assets, then we, Mr. Chairman, will have saved the American taxpayer approximately $2.2 billion while preserving the improved communications capability that Milstar-type systems provide.

I strongly urge my colleagues to adopt this fiscally responsible and technically achievable amendment.

U.S. HOUSE OF REPRESENTATIVES

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

SUITE 2320 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515-6301
(202) 225-6371
Internet: HOUSESST@HR.HOUSE.GOV

May 16, 1994

The Honorable Joseph Moakley
Chairman, Committee on Rules
United States House of Representatives
H312 Capitol
Washington, DC 20515

Dear Mr. Chairman,

Attached please find an amendment I would like to offer to HR 4301, The National Defense Authorization Act for Fiscal Year 1995. This amendment directs the Secretary of Defense to study options for accelerating the development and deployment of the advanced technology MILSTAR III military satellite communication system. This action would eliminate the need for building and launching the fifth and sixth satellites in the presently planned MILSTAR II series, saving the taxpayer approximately $2.2 billion. This amendment also requires the Secretary of Defense to consider the use of commercial communications services, terrestrial lines, or other national assets to meet military requirements.

I would appreciate your support on behalf of the Committee to make this amendment in order.

Sincerely,

GEORGE E. BROWN, JR.
Chairman

cc: Hon. Ronald V. Dellums
Hon. Floyd D. Spence
Hon. Robert S. Walker

House Calendar No. 159

103D CONGRESS
2D SESSION

H. RES. 429

[Report No. 103–509]

Providing for consideration of the bill (H.R. 4301) to authorize appropriations for fiscal year 1995 for military activities of the Department of Defense, to prescribe military personnel strengths for fiscal year 1995, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

MAY 17, 1994

Mr. FROST, from the Committee on Rules, reported the following resolution; which was referred to the House Calendar and ordered to be printed

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RESOLUTION

Providing for consideration of the bill (H.R. 4301) to authorize appropriations for fiscal year 1995 for military activities of the Department of Defense, to prescribe military personnel strengths for fiscal year 1995, and for other purposes.

Resolved, That at any time after the adoption of this resolution the Speaker may, pursuant to clause 1(b) of rule XXIII, declare the House resolved into the Committee of the Whole House on the state of the Union for consideration of the bill (H.R. 4301) to authorize appropriations

House Calendar No. 159

103D CONGRESS
2D SESSION

H. RES. 429

[Report No. 103–509]

RESOLUTION

Providing for consideration of the bill (H.R. 4301) to authorize appropriations for fiscal year 1995 for military activities of the Department of Defense, to prescribe military personnel strengths for fiscal year 1995, and for other purposes.

MAY 17, 1994

Referred to the House Calendar and ordered to be printed

for fiscal year 1995 for military activities of the Department of Defense, to prescribe military personnel strengths for fiscal year 1995, and for other purposes. The first reading of the bill shall be dispensed with. All points of order against consideration of the bill are waived. General debate shall be confined to the bill and the amendments made in order by this resolution and shall not exceed two hours equally divided and controlled by the chairman and ranking minority member of the Committee on Armed Services. After general debate the bill shall be considered for amendment under the five-minute rule.

SEC. 2. It shall be in order to consider as an original bill for the purpose of amendment under the five-minute rule the amendment in the nature of a substitute recommended by the Committee on Armed Services now printed in the bill. The committee amendment in the nature of a substitute shall be considered as read. All points of order against the committee amendment in the nature of a substitute are waived. No amendment to the committee amendment in the nature of a substitute shall be in order except the amendments printed in the report of the Committee on Rules accompanying this resolution and amendments en bloc described in section 4 of this resolution. Except as specified in section 3, 4, or 5 of this resolution, each amendment printed in the report shall be con-

sidered only in the order printed and may be offered only by a Member designated in the report. Each amendment printed in the report shall be considered as read and shall not be subject to a demand for division of the question in the House or in the Committee of the Whole. Unless otherwise specified in the report, each amendment printed in the report shall be debatable for ten minutes equally divided and controlled by the proponent and an opponent and shall not be subject to amendment (except that pro forma amendments for the purpose of debate may be offered by the chairman or ranking minority member of the Committee on Armed Services). All points of order against amendments printed in the report are waived.

SEC. 3. (a) After disposition of or postponement of further proceedings on amendments printed in part 1 of the report of the Committee on Rules accompanying this resolution, it shall be in order to consider the amendments printed in part 2 of the report of the Committee on Rules accompanying this resolution. Such consideration shall begin with an additional period of general debate, which shall be confined to ballistic missile defense and shall not exceed twenty minutes equally divided and controlled by the chairman and ranking minority member of the Committee on Armed Services. If more than one of the amendments printed in part 2 of the report is adopted, only the

last to be adopted shall be considered as finally adopted and reported to the House.

(b) After disposition of or postponement of further proceedings on the amendments printed in part 2 of the report, it shall be in order to consider the amendments printed in part 3 of the report (relating to burdensharing).

(c) After disposition of or postponement of further proceedings on the amendments printed in part 3 of the report, it shall be in order to consider the amendments printed in part 4 of the report of the Committee on Rules accompanying this resolution. Such consideration shall begin with an additional period of general debate, which shall be confined to the Trident II (D–5) missile and shall not exceed twenty minutes equally divided and controlled by the chairman and ranking minority member of the Committee on Armed Services.

(d) After disposition of or postponement of further proceedings on the amendments printed in part 4 of the report, it shall be in order to consider the amendment printed in part 5 of the report (relating to the Seawolf submarine).

(e) After disposition of or postponement of further proceedings on the amendment printed in part 5 of the report, it shall be in order to consider any amendment printed in part 1 of the report not previously considered.

SEC. 4. It shall be in order at any time for the chairman of the Committee on Armed Services or his designee to offer amendments en bloc consisting of amendments printed in part 1 of the report of the Committee on Rules accompanying this resolution or germane modifications of any such amendment. Amendments en bloc offered pursuant to this section shall be considered as read (except that modifications shall be reported), shall be debatable for twenty minutes equally divided and controlled by the chairman and ranking minority member of the Committee on Armed Services, shall not be subject to amendment, and shall not be subject to a demand for division of the question in the House or in the Committee of the Whole. For the purpose of inclusion in such amendments en bloc, an amendment printed in the form of a motion to strike may be modified to the form of a germane perfecting amendment to the text originally proposed to be stricken. All points of order against such amendments en bloc are waived. The original proponent of an amendment included in such amendments en bloc may insert a statement in the Congressional Record immediately before the disposition of the amendments en bloc.

SEC. 5. The chairman of the Committee of the Whole may postpone until a time during further consideration in the Committee of the Whole a request for a recorded

vote on any amendment made in order by this resolution. The chairman of the Committee of the Whole may reduce to not less than five minutes the time for voting by electronic device on any postponed question that immediately follows another vote by electronic device without intervening business, provided that the time for voting by electronic device on the first in any series of questions shall be not less than fifteen minutes. The chairman of the Committee of the Whole may recognize for consideration any amendment made in order by this resolution out of the order printed, but not sooner than one hour after the chairman of the Committee on Armed Services or a designee announces from the floor a request to that effect.

SEC. 6. After disposition of or continued postponement of further proceedings on each of the amendments printed in the report of the Committee on Rules accompanying this resolution and any amendments offered pursuant to section 4 of this resolution, the Committee of the Whole shall rise without motion. No further consideration of the bill shall be in order except pursuant to a subsequent order of the House.

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Union Calendar No. 278

103D CONGRESS
2D SESSION

H. R. 4301

[Report No. 103–499]

To authorize appropriations for fiscal year 1995 for military activities of the Department of Defense, to prescribe military personnel strengths for fiscal year 1995, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

APRIL 26, 1994

Mr. DELLUMS (by request) introduced the following bill; which was referred to the Committee on Armed Services

MAY 10, 1994

Reported with amendments, committed to the Committee of the Whole House on the State of the Union, and ordered to be printed

[Strike out all after the enacting clause and insert the part printed in italic]

[For text of introduced bill, see copy of bill as introduced on April 26, 1994]

A BILL

To authorize appropriations for fiscal year 1995 for military activities of the Department of Defense, to prescribe military personnel strengths for fiscal year 1995, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

sec. 201

sec. 234

HR 4301 sec. 243

the Secretary of Defense entitled "Report on the Bottom Up Review" and in Defense Planning Guidance.

SEC. 233. THEATER MISSILE DEFENSE RISK REDUCTION ACTIVITIES.

(a) IN GENERAL.—Of the amount provided in section 201 for Defense-Wide Activities, $210,000,000 is for theater missile defense risk reduction activities of the Ballistic Missile Defense Organization. None of such amount may be obligated for a program specified in subsection (b) until 30 days after the date on which the Secretary of Defense submits to the congressional defense committees notice of the Secretary's plans to obligate funds for such program.

(b) PROGRAMS.—The programs referred to in subsection (a) are the following:

(1) The Extended-Range Interceptor (ERINT) program.

(2) The Multi-Mode Missile.

(3) Sea-based lower tier systems.

(4) Sea-based upper tier systems.

SEC. 234. MILITARY SATELLITE COMMUNICATIONS.

(a) MILSTAR LIMITATION.—Of the amount authorized in section 201 for the MILSTAR satellite communications program, $50,000,000 may not be obligated until a report setting forth the plan described in subsection (b) has been received by the congressional defense committees.

(b) MILITARY COMMUNICATIONS MASTER PLAN.—The Secretary of Defense shall develop a military communications master plan that addresses—

(1) the projected military communications requirements of the Department of Defense;

(2) alternate and innovative ways of meeting those requirements (including greater reliance on the commercial sector); and

(3) methods to ensure that those elements of the Department of Defense that create the demand for such communications services are required to have an important role in paying for the provision of those services.

SEC. 235. LIMITATION ON FLIGHT TESTS OF CERTAIN MISSILES.

(a) LIMITATION.—The Secretary of Defense may not conduct a flight test program of theater missile defense interceptors and sensors if an anticipated result of the launch of a missile under that test program would be release of debris in a land area of the United States outside a designated Department of Defense test range.

(b) DEFINITION OF DEBRIS.—For purposes of subsection (a), the term "debris" does not include particulate matter that is regulated for considerations of air quality.

103D CONGRESS
2d Session

HOUSE OF REPRESENTATIVES

REPORT
103–499

NATIONAL DEFENSE AUTHORIZATION ACT FOR FISCAL YEAR 1995

REPORT

OF THE

COMMITTEE ON ARMED SERVICES HOUSE OF REPRESENTATIVES

ON

H.R. 4301

together with

ADDITIONAL AND DISSENTING VIEWS

[Including cost estimate of the Congressional Budget Office]

MAY 10, 1994.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

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U.S. GOVERNMENT PRINTING OFFICE
78–825 WASHINGTON : 1994

ITEMS OF SPECIAL INTEREST

Advanced boresight equipment

The budget request included $1.4 million, $1.3 million, and $900,000 for the Army, Navy, and Air Force, respectively, for advanced boresight equipment. This new type equipment for boresight weapons systems offers considerable manpower savings for the military services. The committee recommends and additional $1.0 million each, for the Navy and Air Force in PE 205633N and PE 708026F, respectively.

Decision support technology

The budget request included $8.673 million in PE 603789F for command, control, and communications advanced technology development. The committee recommends an additional $7.0 million to conduct a technology demonstration of decision support technology that includes use of massively parallel computers to accomplish real time mission planning, three dimensional geographic information, and real time digital image transfer.

Ducted rockets

The budget request included $4.194 million in PE 603216F for continued development of variable flow ducted rocket motors for current and future missile systems. The committee recommends an additional $6.0 million to facilitate technology transition to increase overall end-game kinematics for current and future missile systems.

F–111 squadrons

The budget request included $10.015 million in PE 207129F, project 1930, for program termination actions associated with the stores management system because the Air Force plans to eliminate the F–111F from its force structure. An additional $5.073 million is projected for termination actions in fiscal year 1996. The committee recommends a total of $500,000 for program termination.

Microencapsulated phase change materials

In fiscal year 1992, Congress began a program to determine the usefulness of microencapsulated phase change materials (MicroPCM) in aircraft avionics cooling systems. That program is progressing well and preliminary results the expected at the end of fiscal year 1995. In order to ensure that the two MicroPCM initiatives are funded through fiscal year 1995, and to avoid unnecessary contract or program gaps, the committee recommends an additional authorization of $1 million in PE 602201F.

report

Military satellite communications

The budget request contained $607.248 million for research and development of the Milstar communications satellite, and $22.095 million for advanced military satellite communications.

Milstar is a complex and expensive communications satellite system that was originally designed to ensure secure communications between the national command authority and U.S. strategic nu-

clear forces throughout a protracted nuclear war. With the Cold War's end, Milstar has been modified to be more relevant to the new security conditions. However, it still retains important features from its Cold War origins, and relies upon costly Titan IV boosters for launch.

The committee understands that the advanced Milstar under development, Milstar III, will incorporate technologies not available when Milstars I and II were designed, allowing it to be launched on a less expensive medium launch vehicle. The committee believes that development of Milstar III, the follow-on to Milstar II, should be accelerated so that it can be deployed early in the next decade. In these circumstances, the committee directs the Secretary of Defense to modify Milstar plans accordingly.

The committee has recommended authorization of $607.248 million in PE 604479F for research and development for Milstar. The committee also recommends authorization of $35 million in PE 603430F for the advanced extremely high frequency (EHF) military satellite communications program. Of the $607.248 million, $12 million may be used either for long lead funding for Milstar II satellites 5 and 6 or to further accelerate the advanced EHF military satellite communications program. This is subject to the restriction that such funds (the $12 million) may not be obligated until 30 days after the Secretary of Defense has reported to the congressional defense committees on plans to spend these funds, and has commented on the statement the Comptroller General made concerning the Milstar II. (The Comptroller General's testified before the committee on Milstar on April 14, 1994 and submitted a prepared statement.)

The committee is concerned about the fragmented nature of the variety of military communications satellites and the disturbing tendency of such programs to remain isolated from the burgeoning advances of the commercial telecommunications industry. The committee is also concerned about the serious gap that exists between those who establish the requirements and create the demand for military communications networks and those who must pay for them. The committee believes the Department needs to develop a plan for military communications that takes advantages of the commercial telecommunications infrastructure and establishes appropriate interservice funding support so that those who make the decisions concerning quantity and quality of use must fund the impact of those decisions.

Accordingly, section 234 would require the Secretary of Defense to develop a military communications master plan that would address: the Department of Defense's projected military communications requirements; alternative and innovative ways of meeting those requirements; and methods to ensure that those elements of the Department that create the demand for such communications services are required to have an important role in paying for the services.

The provision also would prohibit the obligation of $50 million for the Milstar program until the congressional defense committees receive the master plan. The committee expects the Secretary to submit this plan to the congressional defense committees no later than April 15, 1995.

THE SECRETARY OF DEFENSE

WASHINGTON, DC 20301-1000

16 MAY 1994

The Honorable Floyd D. Spence
Ranking Republican, Committee on Armed Services
House of Representatives
Washington, D.C. 20515-6035

Dear Mr. Spence:

We are responding to Chairman Dellums' April 25, 1994 letter requesting our views on H.R. 4283, 103rd Congress, 2nd Session, a bill "To terminate the Milstar II Communications Satellite Program."

The Department of Defense opposes this legislation. H.R. 4283 would terminate a critically important program that supports the combat potential of current and future military forces. Milstar provides command and control and information transfer capabilities essential to a smaller fighting force.

As you know, the Milstar program has been subjected to extensive reviews by this Department during the previous and current Administration. The extensive nature of those reviews provides evidence of our conviction in the need for the Milstar II system. I offer the following rationale for this essential combat support capability.

The Milstar system is planned to provide operational forces -- especially highly mobile tactical units -- secure, survivable, flexible communications on a world-wide basis. The system operates in a previously unused portion of the radio spectrum -- Extremely High Frequency (EHF). This attribute plus other features, like advanced signal processing and crosslinks, provide unique mission capabilities. Milstar supports fundamental requirements to provide integrated connectivity for theater and tactical elements through a modernized, jam-resistant communications network. Milstar is designed to satisfy requirements essential to the military needs of a CONUS-based, power-projection force:

- Anti-jam: Milstar communications are virtually immune to jamming.

- Covert Operations: Milstar provides low probability of intercept/detection; its use will not compromise the location of users to enemy listening systems.

- Deployment and Mobility: Milstar terminals will deploy and move with front-line forces.

- Coverage and Connectivity: A complete constellation of four satellites will ensure worldwide access (except in the polar regions).

- Interoperability: Army, Navy, Air Force, and Marines -- Milstar enables immediate communications between all Services.

- Reachback: Milstar enables communications out of theater without reliance on foreign-based ground relays vulnerable to destruction, sabotage, or host nation policy restrictions.

The first two Milstar satellites will enable efficient synchronization of combat power and are not vulnerable to enemy efforts to deny U.S. forces this capability. With the addition of Milstar II satellites #3 through #6, Milstar will add additional capability to provide more data, faster to combat commanders. It will also enable the Army's Mobile Subscriber Equipment (MSE) to provide global communications to mobile combat commanders. No other system, existing or planned, can provide the flexibility and assurance of uninterrupted communications available from Milstar.

In response to Congressional direction, the Department restructured the Milstar program extensively three years ago. The Department significantly reduced cost and tailored the program to the changes in the national security environment. A Medium Data Rate payload was added to the satellite design and designated as the Milstar II satellite. The Department reviewed requirements and tailored the capabilities of Milstar II to provide "flexible" and assured communications for mobile forces -- redressing deficiencies observed during Desert Storm when U.S. ground forces outran their communications support.

In 1993, we further scrutinized the Milstar program as part of the Bottom Up Review -- consistent with a military strategy focused power projection and possible future theater conflict. The Department evaluated numerous alternatives to Milstar while considering an updated threat estimate, operational requirements, cost-effectiveness tradeoffs, risk, and affordability. The review emphasized Low and Medium Data Rate capabilities for U.S. tactical forces. It specifically addressed possible lower cost alternatives to the baseline program.

Our current investment strategy -- two Milstar I satellites, four Milstar II satellites, followed by a transition to an advanced EHF satellite not later than FY 2006 -- was selected because it best met military requirements and represented the best means of providing essential capability while reducing overall program cost. All other options were higher risk and deferred providing essential operational capability.

Transition to an advanced EHF system is an integral part of our investment strategy. However, its development represents a technical challenge. During the Bottom Up Review, the Technical Support Group identified the lack of maturity in packaging microwave and digital electronics as a risk area in downsizing the satellite payload so it could be launched on a medium launch vehicle (MLV). Our FY 1995 budget includes a request for $22.1 million to begin a focused technology effort to ensure technologies mature sufficiently to allow transition to a smaller payload.

We are continuing to search for the best approaches to this concept. If it is possible to transition to an advanced satellite sooner, save more money, and continue providing essential military capability with acceptable risk -- we will recommend such a program to Congress. The Department is committed to fielding cost-effective, affordable protected communications capabilities.

The Joint Chiefs of Staff have assured me they firmly support the requirements for assured, protected communications. The Milstar system satisfies these critical combat requirements in a timely and cost-effective manner. To cancel Milstar II at this time would save money only by deferring necessary capability and accepting additional risk to our defense posture for the next decade -- risk which could erode deterrence or translate into increased loss of life in a potential future conflict. Cancellation would also adversely impact a limited industrial base for the sophisticated processed EHF technologies that are the basis of the Milstar system.

The Department strongly recommends that the Milstar II communications satellite program not be terminated. It is a fundamental element in the Department of Defense mix of military and commercial satellite communications.

Sincerely,

William J. Perry

Committee on Science, Space, and Technology
United States House of Representatives

DATE: 11 May 1994

TO: Mr. Brown

THRU: Bill Smith

FROM: Robert Kennedy (2nd revised version)

This memorandum addresses three major military satellite communications programs, and the Milstar debate in particular. The goal of the initiative is to identify paths to a robust, convergent, civil-military space communication system.

Milstar

Background. The antecedents of Milstar were first conceived 20 years ago to provide survivable, secure, jam-resistant, flexible, low data rate (LDR) microwave communications in the Extremely High Frequency (EHF, 30 - 300 GHz) band between the National Command Authority and strategic forces during a nuclear war. A total of 20 satellites were planned to be built, of which eight would be in orbit at any one time. Originally expected to cost a maximum of TY$40.7B, the program has been restructured three times since then. About $10B has been spent so far. See slides #1A, #1B, and #2. The first LDR satellite (called Milstar I) was delayed from 1987 and finally launched February 7 this year.

Low data rate means 82 channels of data transmission from 75 up to 2400 bits/second per channel, the same as a home computer modem. There are about 40 more channels at up 75 - 300 bits/sec. See slide #3.

Secure communications means a low probability of intercept by anyone but the designated receiver as well as a low probability of detection of the sender's signal by nearby hostile forces. See slide #4. These goals are achieved with very narrow EHF beams, plus unpredictable frequency hopping, plus tough encryption with redundant coding.

Anti-jam means avoiding hostile jamming or self-jamming by shifting the

inbound and outbound signals around in a large band of frequencies (like finding a moving needle in a haystack). See slide #5. It is very easy to jam satellite signals to and from small aperture tactical antennas, even without hostile intent. Taxi radios, for instance, operate in the same band as UHF satellites; if operated at the same frequency, they would knock the satellite off the air. Milstar was designed to overcome fixed Soviet "sanctuary" jammers--city sized power plants dedicated for jamming. In addition, the on-board processing subtracts the effect of jamming from an uplinked signal, relaying a clear signal to the designated recipient. By comparison, all other satellites pass along whatever signals they receive, clean or not. (Historical note on self-jamming: The Exocet missile which destroyed the *HMS Sheffield* got through because the ship's X-band antimissile radar was turned off so that the ship could talk to home on the same band.)

Survivable means that the signal will punch through atmospheric static, called scintillation, caused by nuclear weapons. Survivable also means that Milstar itself is resistant to the intense electromagnetic pulse (EMP) produced by nuclear weapons, can operate autonomously, and can be controlled by a variety of dispersed assets. See slide #6. Moreover, the crosslinks between satellites permit them to route signals through each other rather than via more vulnerable ground assets. See slide #7.

No other communication satellite in the sky has these features, or needs to. The rescoped Milstar mission is unique. See slide #8.

Milstar As It Is Now. The present Milstar program is greatly downsized from its Cold War origins, and is reoriented to a much more tactical mission, especially for the Navy and the Army. See slides #9 and #10. Mean time to failure is estimated to be 8 - 10 years. A classified payload (which this writer is not cleared to know) became irrelevant; it was launched on the first bird anyway because it would have been more expensive to remove it and re-engineer the satellite. On the second Milstar I, which is now 99% complete, the classified payload has been replaced with a mass that has identical inertial properties. This is the origin of the "ballast" stories you may have heard. The shielding which imparts "heroic survivability" is still there, but, by not being tested "heroically," the satellite is not considered to have that capability. A Milstar II basically consists of a Milstar I with a medium data rate (MDR) package substituting for the classified payload. The term "medium" is

somewhat misleading, as MDR means up to 1.544 *mega*bits/second per channel, almost 700 times greater than LDR. One commander on the *USS Theodore Roosevelt* (CVN-73) said that MDR would be useful for downloading the appropriate technical manual in real time during a battle.

The Future of Milstar. Sometime around 2002-2005 all three U.S. military communications constellations (Milstar II, DSCS III, and UFO) will start to degrade as individual satellites fail. DoD has initiated several studies, including two with France and the United Kingdom, to decide whether to converge to a common satellite bus with mission- and nation-specific modules. DoD is also conducting studies to determine whether the so-called "Milstar III" (the advanced technology replacement for Milstar II) can fulfill all three missions. Finally, the studies will compare the cost of deploying a single large class of satellites by a Titan-class vehicle versus two or more classes on medium launch vehicles. The results of the study are due in the late fall and will provide input to DoD's FY96 budget plan.
In a related issue, perhaps the crosslink technology developed for Milstar can be adapted to the new ALARM early warning satellite thereby avoiding the cost of an additional independent crosslink development.

Last November, DoD promulgated a policy that ALL defense signal traffic be carried by either a) a single secure satellite system, b) commercial satellites, or c) secure fiber optics cables. See slide #11, which illustrates how the total estimate defense signal traffic might be apportioned among these three modes.

Another report, the Congressionally-mandated "The Commercial Satellite Communication Initiative" has been written by DoD, but not blessed by chain of command yet.

DSCS III

Each DSCS III satellite can carry about 200 Mbits/sec of traffic in an unstressed state. However, with mild jamming, this figure drops to 3 Mbits/sec; with significant jamming, the capacity drops further to low hundreds of kilobits/sec. Spread over enough channels, this low capacity could still provide minimum strategic warfighting communications. Compare this number to the peak requirement during Desert Storm, which was 100 Mbits/sec.; note that each Milstar II can carry up to 40

Mbits/sec. of traffic securely; each Milstar I can carry about 200 Kbits/sec. Also compare this number to the 13 gigabits per second requirement forecast for ten years from now, of which 1 gigabit must be secure anti-jam. See again slide #11. This DoD forecast was based on fighting two medium regional conflicts (MRC) simultaneously.

UFO

UFO (Ultra high Frequency Follow-on) is the Navy's new fleet satellite communications system (FLTSATCOM) scheduled to be deployed later in the decade. A number of promising procurement initiatives were tried in this program, including commercial-like procurement specification, fixed price contracting and on-orbit delivery. As of this April, two units have been successfully placed in orbit. Later versions of UFO will provide 10 anti-jam LDR channels.

TDRSS

There is no commercial or other asset today that can perform the job that TDRSS does. One company, Hughes does have a proposal for very high data rate relays in orbit. If built, "Spaceway" would provide global T1 links, roughly equivalent in capacity to fiber optic cables without the expense of physically laying lines to each and every customer site in the world. Such a proposal possibly represents an opportunity for NASA/ commercial/ military convergence.

There are six options for you to consider for the Milstar program.

Ia. Cancel the entire Milstar program immediately.
This would avoid about TY$20B in future expenditures, but waste the two satellites that are already built (one of which is already in orbit) as well as the nearly $10B that has been spent so far. DoD would have only hundreds of kilobits/second satcom capacity that is jam-proof and secure. This is barely adequate for the minimum strategic requirement, and completely inadequate for tactical use. Shutdown costs are very roughly estimated to be $1B.

Ib. As above, but continue to operate the Milstar I in orbit.
Savings would be at least TY$13B. The difference is due to an unknown number of Army, Navy, and Air Force terminals (up to TY$8.1B worth) which would be deployed for Milstar I to talk to. The annual operating cost of the Milstar I alone is $40M, about the same as the cost to just store it. This option would only provide partial coverage of the globe at low data rates.

II. Cancel the Milstar II program after deploying the second Milstar I.
This is Rep. Maloney's plan, introduced as HR 4283. A similar bill has been introduced in "the other body" as S. 1941 (Messrs. Bumpers and Leahy, et. al.). The second Milstar I satellite is already 99% complete. The Titan IV launcher is already paid for. Annual operating cost is also $40M. The third and fourth satellites are up to 65% complete. This option would provide limited anti-jam coverage of the globe, but still only low data rates. Again, shutdown costs are roughly $1B. There would be no replacements after the constellation starts to fail about 2002. This option might save as much as TY$13.7B if no alternative capability was purchased.

IIIa. Cancel the entire program after deployment of the third and fourth satellites.
This option would provide near global coverage for anti-jam communications, but only partial coverage at medium data rates. Annual operating cost of more than two Milstars is $110M. There would be no replacements after the constellation starts to fail about 2005. This option saves about $1.6B in marginal costs by not buying the last two satellites, and about $600M by not buying 2 Titan IV rockets.

IIIb. As above, but accelerate the development of the advanced technology follow-on.
This is the GAO recommendation. (Language in the HASC markup of HR 4301 gives DoD latitude to choose either to procure long lead items for satellites #5 and #6, or redirect the funds to accelerating the advanced technology satellites.) This is also the same as Option 4 in the Pentagon's Bottom Up Review. Again, this option would save about $1.6B in marginal costs by not buying the last two satellites, and about $600M by not buying the two Titan IV rockets. However, the development of the advanced technology satellite (the so-called "Milstar III") must be accelerated, therefore the cash flows from satellites #5 and #6 should be redirected to development. "Milstar III" should be at least as capable, but cheaper and smaller, and therefore cheaper to launch. Since the SecDef has already restructured the program once, it should not be unthinkable to do so again. This option may result in delaying global coverage at medium data rates by one to six years to as late as 2006.

(Validating the likelihood and risk of this gap could be the subject of a hearing this year.)

IV. Do Nothing.
Allow the DoD to continue the planned deployment of one more Milstar I, four Milstar IIs, and development of five smaller advanced technology Milstars to be launched about 2006. Even under DoD's own plan, the gap in global MDR coverage does not close until 2002.

Sources

Milstar Briefing (UNCLAS), DoD Legislative Liaison, 04 May 1994.

Testimony by GAO to National Security Subcommittee of the Government Operations Committee, 2 Feb 1994.

"Whither Milstar?" (U), Rand Corp. briefing and issue paper to Project Air Force, September 1993.

DoD response to RAND, *Inside the Pentagon*, 24 Feb 1994.

"Military Satellite Communications: Opportunity to Save Billions of Dollars", GAO/NSIAD-93-216, July 1993

#1
#2
#3
#4
#5
#6
#7
#8
#9
#10
#11

SLIDES

1A

Milstar Life Cycle Cost 1992-2011

	Pre-Restructure	1991 Restructure	1992 DAB	Bottom-Up Review
Program Baseline	8-Ball 20 Milstar Is 1721 Terminals FY91-10	6-Ball 3 Milstar Is 13 Milstar IIs 1467 Terminals FY91-10	4-Ball 2 Milstar Is 9 Milstar IIs 1236 Terminals FY92-11	4-Ball 2 Milstar Is 4 Milstar IIs 5 Adv MILSATCOM 1236 Terminals FY92-11
LCC Estimate (TY$B)	40.7	30.8 4.5	27.4	22.8

add 7.1

1B

The Navy uses an omnidirectional antenna

3 THz = 3E12 cycles

$\lambda = c/\nu = 3E8\ m/s \div 3E12\ [s^{-1}] = 1E{-}4$

= 0.1 mm = 100 μm = 100K nm = 1M Å

compare 7500 Å red visible

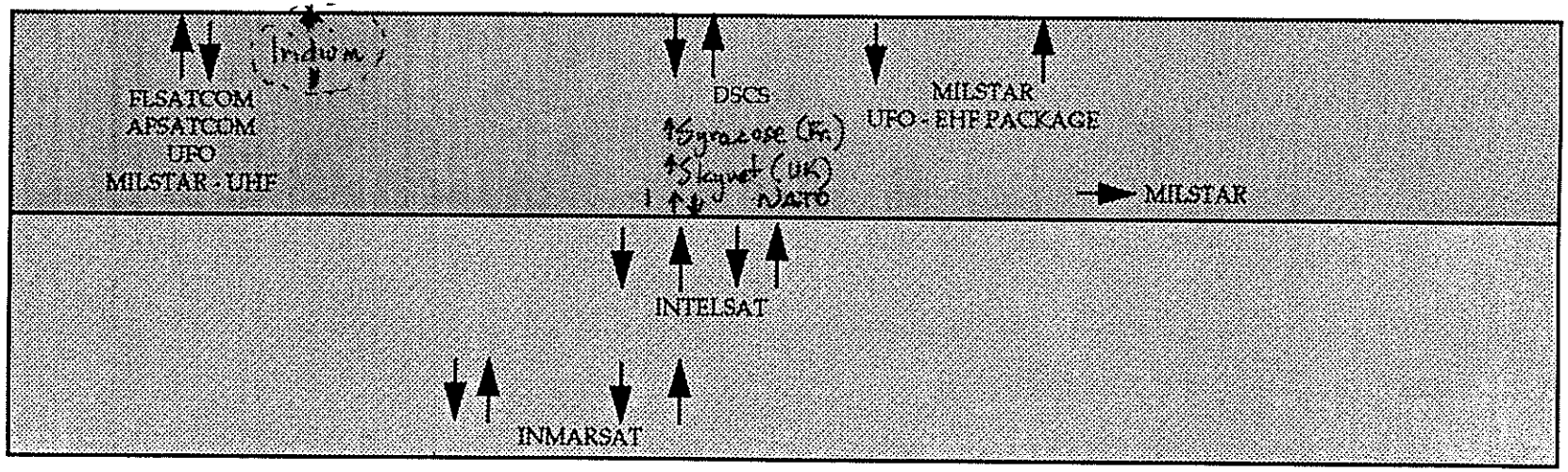
SATCOM FREQUENCIES

the Promised Land

worst on East Coast in afternoon

rain fading

RADIO WAVES	MICROWAVES								INFRARED
	L	S	C	X	Ku	? peak O_2 atten	Ka	44 85 Attenuation Valleys	
	25 kHz channels UHF ULTRA HIGH FREQUENCY		SHF SUPER HIGH FREQUENCY			60 Valley		EHF EXTREMELY HIGH FREQUENCY	
0.3 GHz		3 GHz			30 GHz			300 GHz	
λ = 1M		λ = 100mm			λ < 10mm			λ = 1mm	

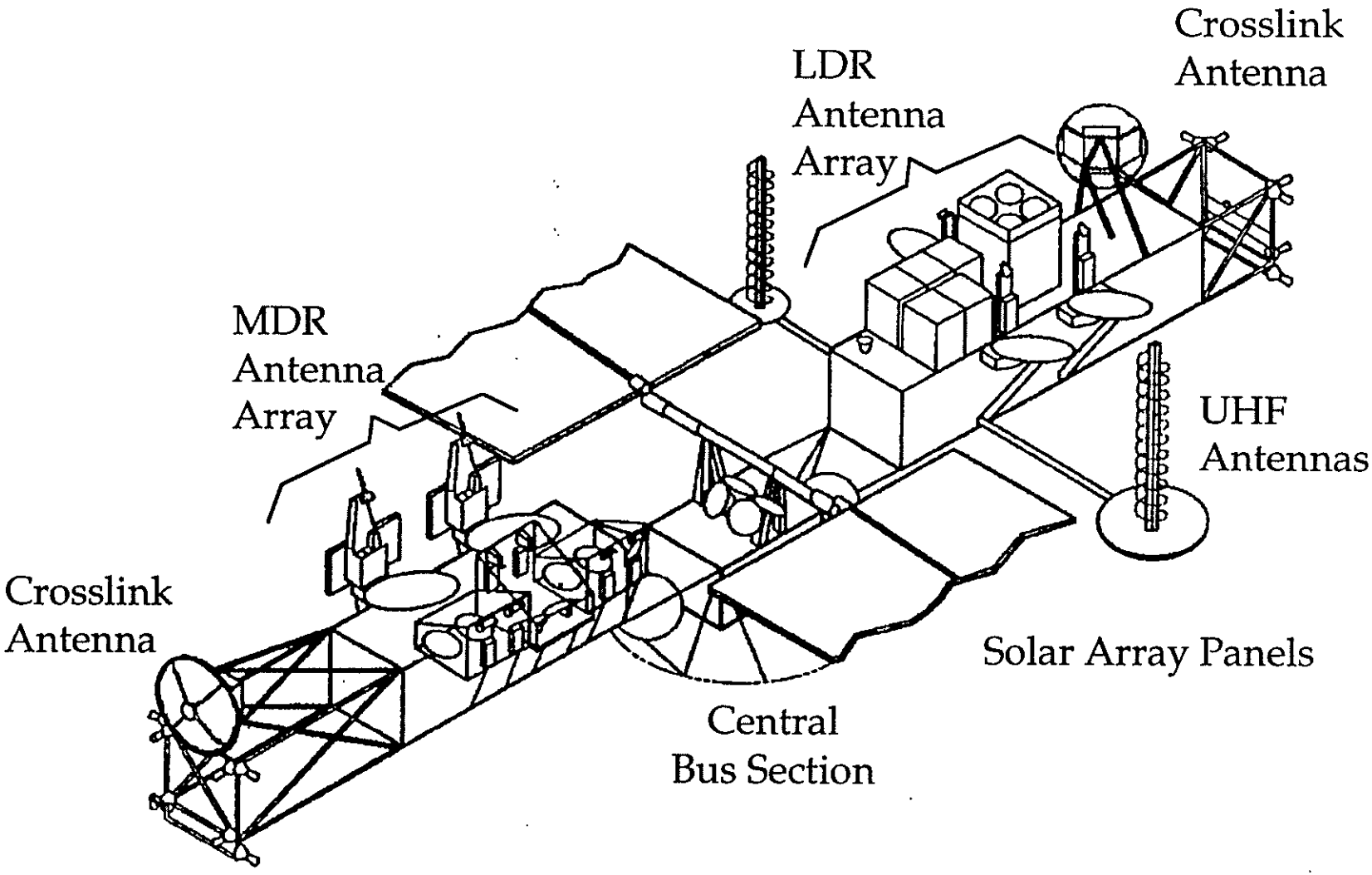


↑ UPLINK (GROUND TO SATELLITE)

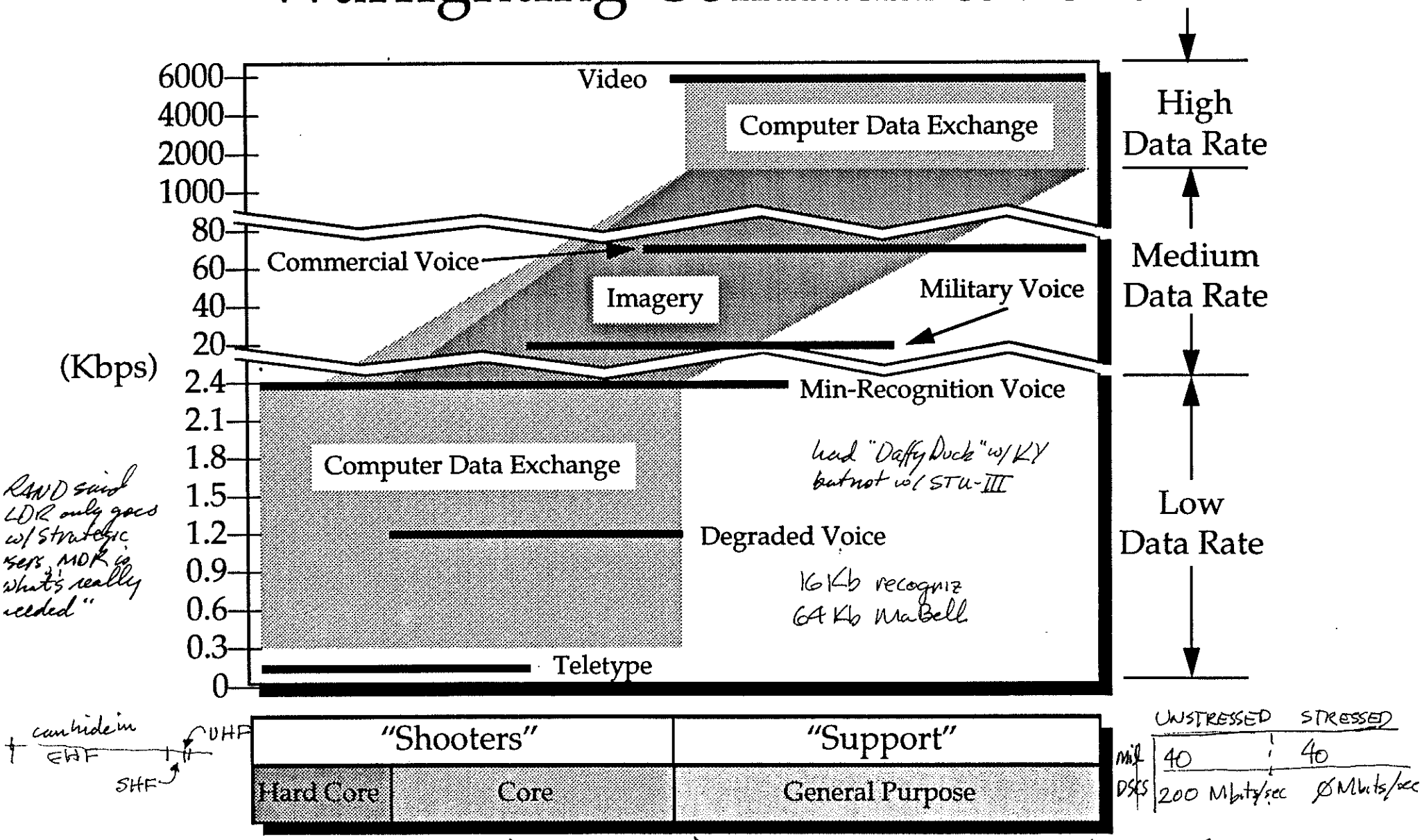
↓ DOWNLINK (SATELLITE TO GROUND)

→ CROSSLINK (SATELLITE TO SATELLITE) planned

Milstar II Satellite



Warfighting Communications



RAND said LDR only goes w/ strategic users, MDR is what's really needed"

can hide in

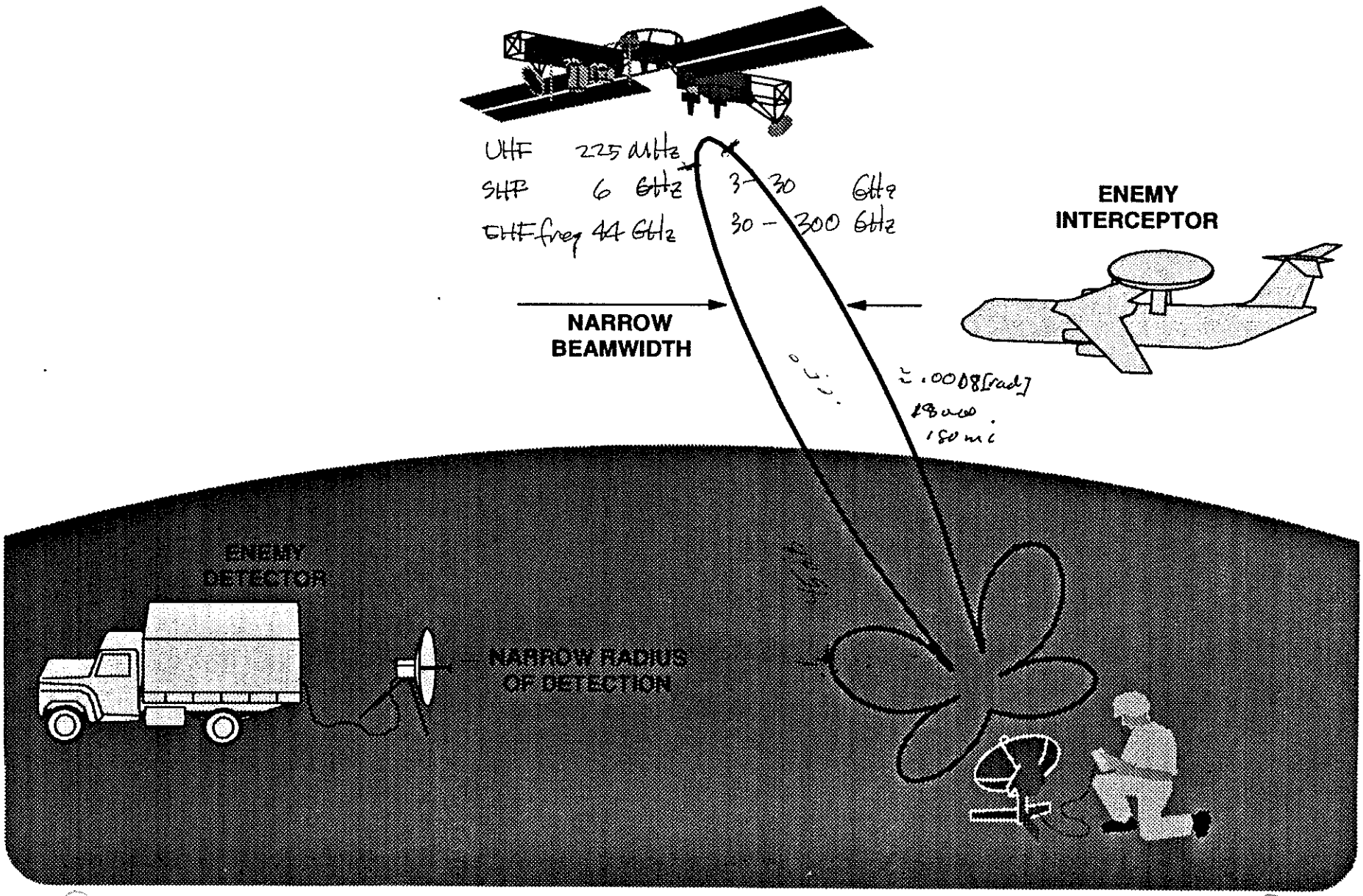
head "Daffy Duck" w/ KY but not w/ STU-III

16 Kb recogniz
64 Kb MaBell

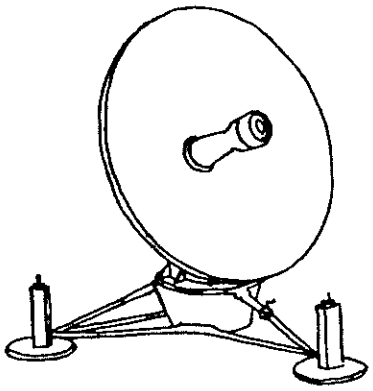
can be knocked off for hours at a time

UHF is easily jammed in metro areas
SHF is more sophisticated

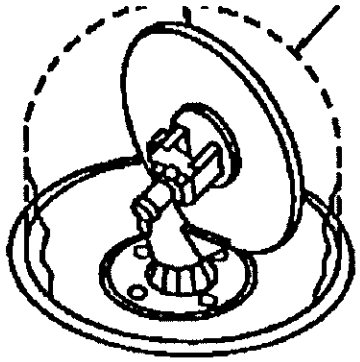
Low Probability of Interception/Detection



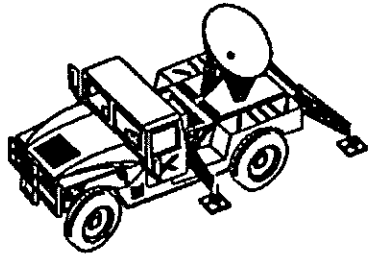
Milstar Terminals



Fixed/Trans. Ground Terminal
7.5 Foot Antenna
59 Planned
CINCs and Sensors



Fixed Shore Terminal
6 Foot Antenna
69 Planned
Navy Command & Control



SMART-T
4.5 Foot Antenna
377 Planned
Army/AF Mobile Forces

Ship Terminal
2.9 Foot Antenna
286 Planned
Command & Attack
Ships

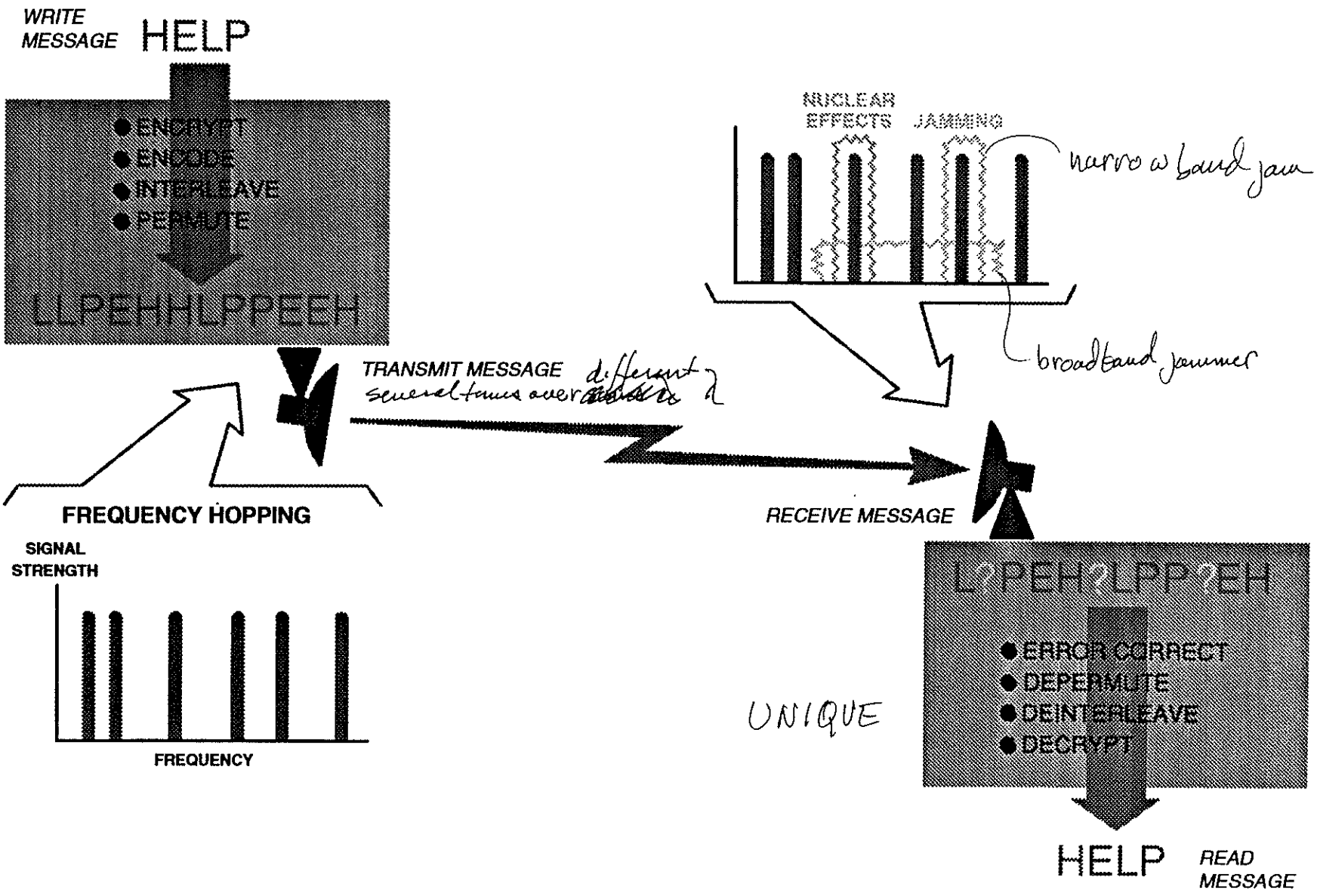
Airborne Terminal
2.2 Foot Antenna
22 Planned
Command & Relay
Aircraft

SCAMP
2 Foot Antenna
3005 Planned
Special Operations

Submarine Terminal
0.5 Foot Antenna
80 Planned
SSNs and SSBNs

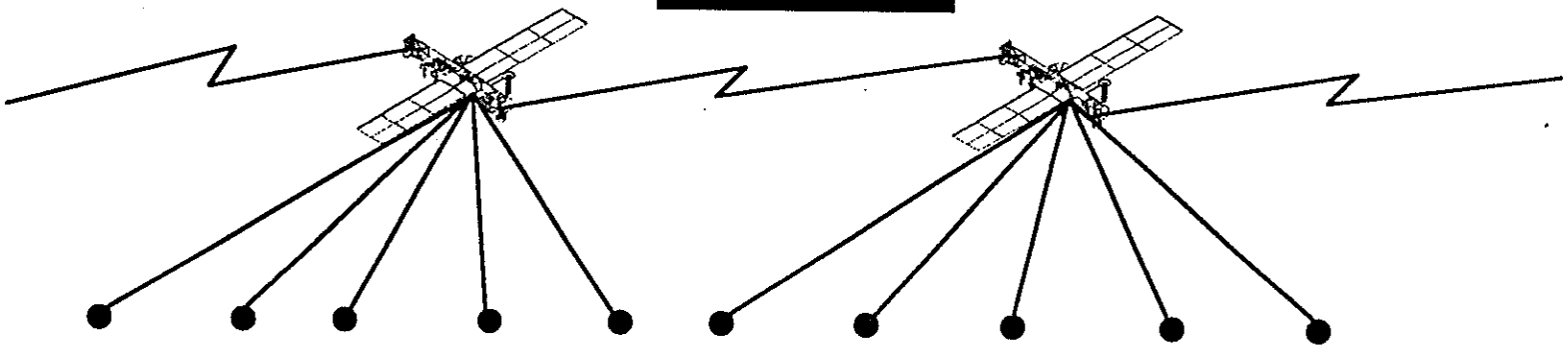
The cost driver for EHF antennas

Milstar Waveform



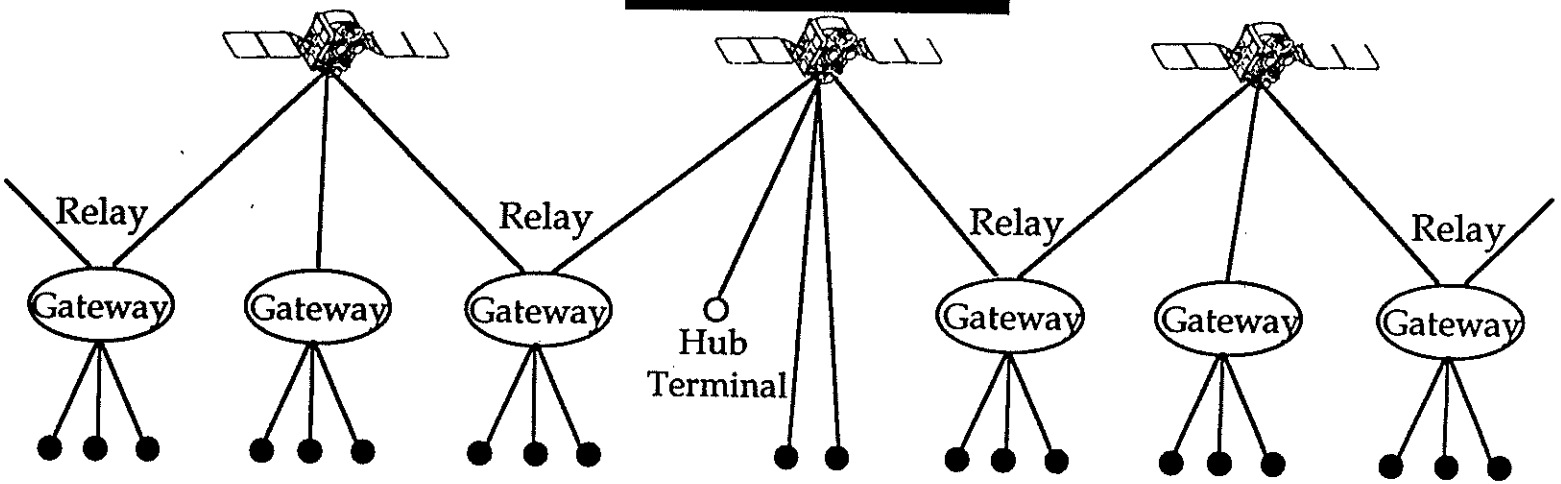
Satellite Communications Architectures

Crosslinks



Weapons and Warriors

Ground Relay

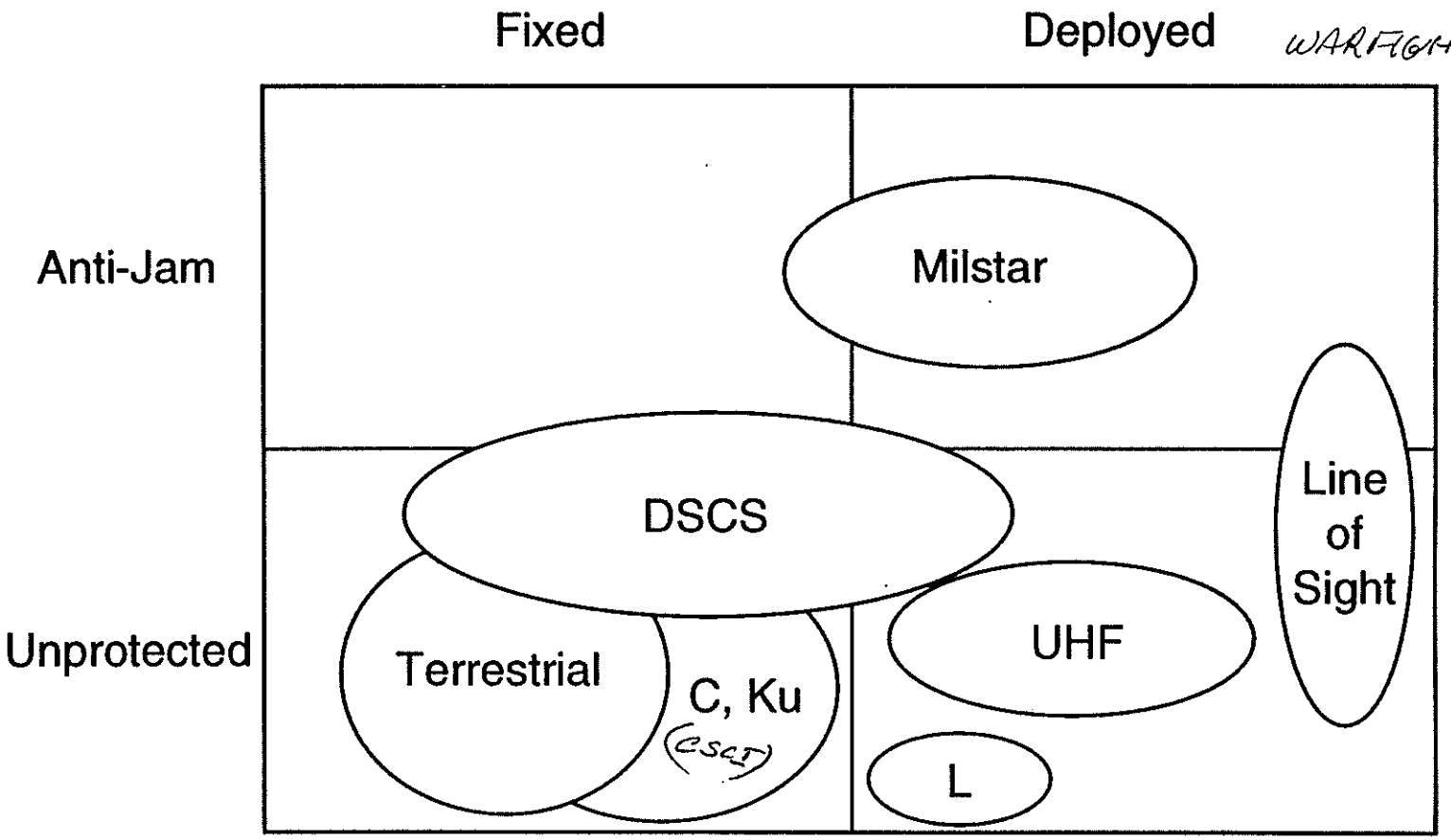


Weapons and Warriors

8

DRAFT Mar
corrected 14 Apr
↓
DEA

MILSATCOM Systems



WARFIGHTING

+7 yrs to deploy a good idea

Bo Hom up reviewed

Congress gave DISA $15M to do study on comm's report due DRAFT ckt
Col Mike Kerin
@DISA/NSO
(703) 696-1819
Don't lease circuits lease transponders

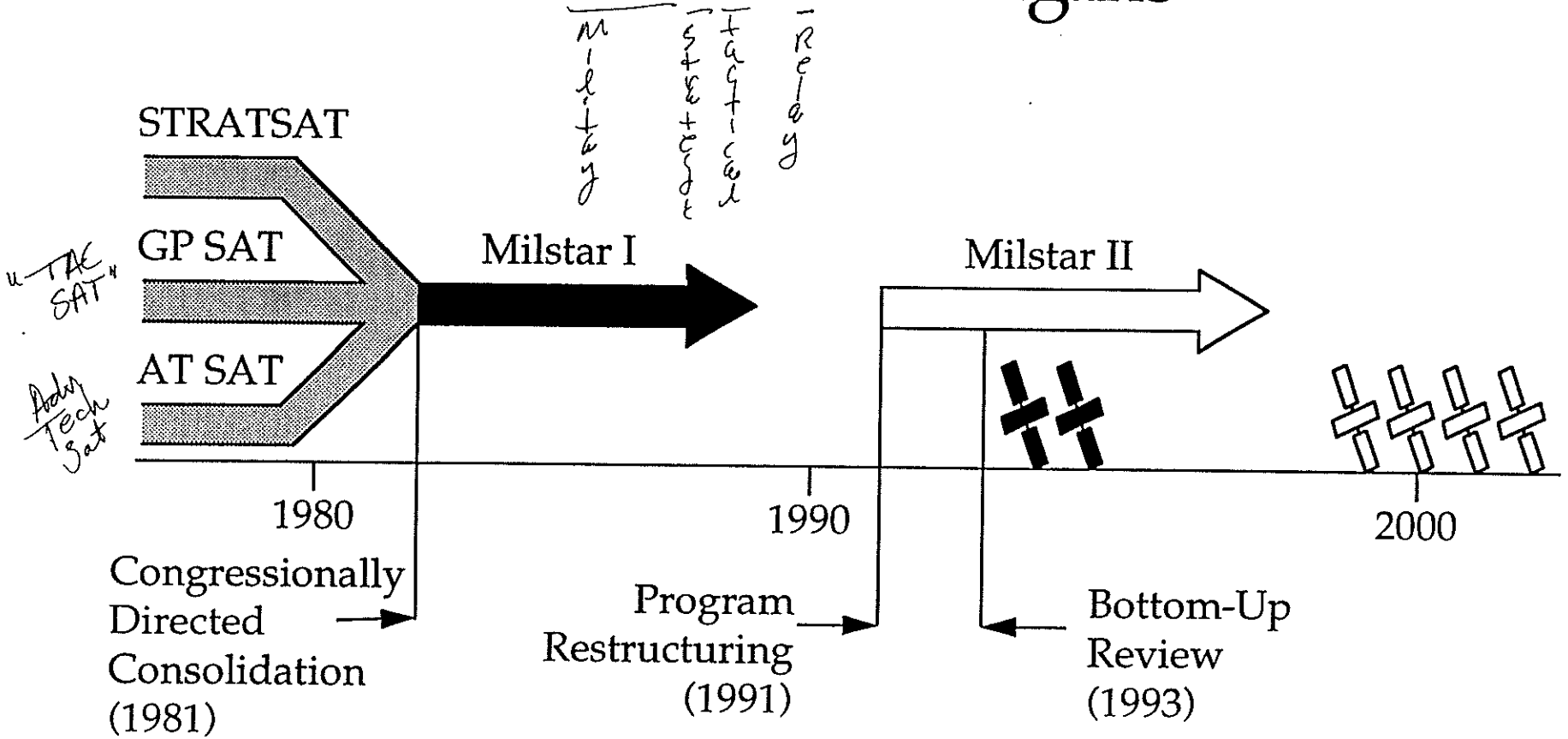
Note: L, C, Ku Bands Are Commercial Frequencies

could procure UFO, hire commil turn to op., w/some spec. features station in low population areas where needed.

Commercial Sat role in MILSATCOM

Bill Hawkins 875-7571 Debra Cecil Lewis

Milstar's Origins



MILSTAR
(**MIL***itary* ***S****trategic* ***T****actical* ***A****nd* ***R****elay*)
Satellite Communications System

10

Stressed: all on Milstar
3 MB/sec on DSCS
unstressed traffic: large amount going commercial

could pull AdvTech up to 2004 with risk
prob 2008

Evolution II

1990 | 2000 | 2010

1 2 — MILSTAR I (99% comp deliv in Aug.)

3M 4 5 6 — MILSTAR II (65% — 75 — Ø Ø)

7 8 9 10 11 — ADVANCED EHF SATELLITE

- REDUCED SIZE
- REDUCED COST

DSCS cost (~250M ea)

projected unit cost n/a
Dr. Iafredo in PA+E can give exact #

BUR

TITAN IV LAUNCH
10,000 LBS

MLV LAUNCH
4,500 LBS

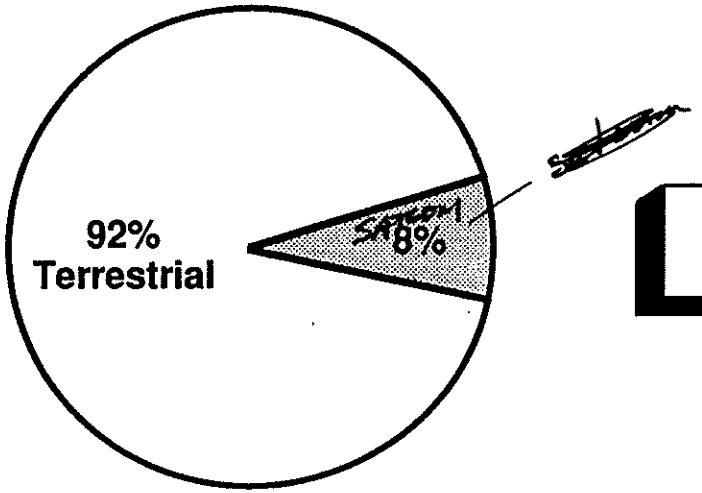
MILSTAR OPERATIONAL REQUIREMENTS DOCUMENT

- TACTICAL SURVIVABILITY
- AUTONOMOUS OPERATION
- TACTICAL USERS
- GLOBAL CONNECTIVITY
- FLEXIBLE RECONFIGURATION
- INTEROPERABLE EQUIPMENT
- ANTI-JAM SIGNALS
- LOW PROBABILITY OF INTERCEPT/ DETECTION
- SIGNAL SECURITY
- WIDEBAND ANTI-JAM
- MOBILE SUBSCRIBER EQUIPMENT
- IMAGERY/INTELLIGENCE
- AIR TASKING ORDERS
- NAVAL OPERATIONS

DOD COMMUNICATIONS REQUIREMENTS FAR TERM (2003)

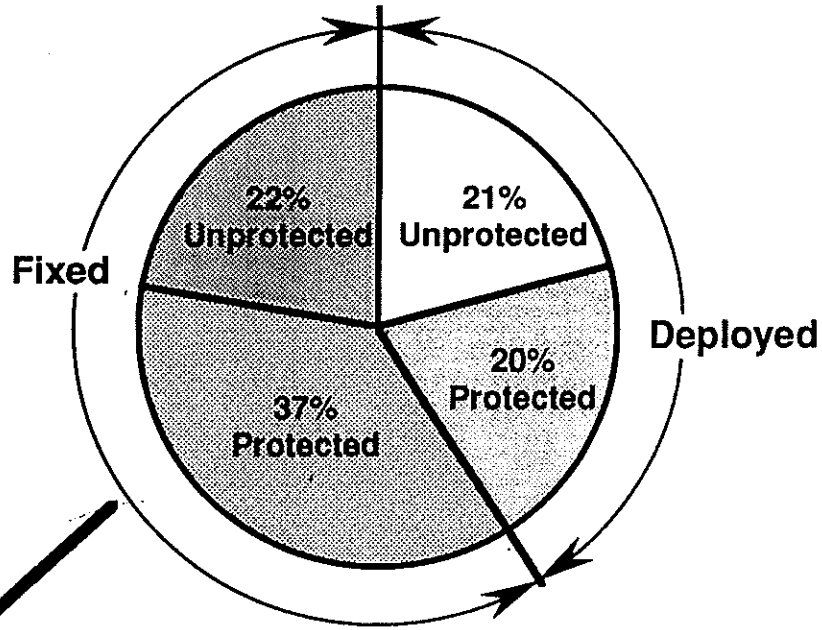
2 MRC Scenario

TOTAL REQUIREMENTS = 13 Gbps

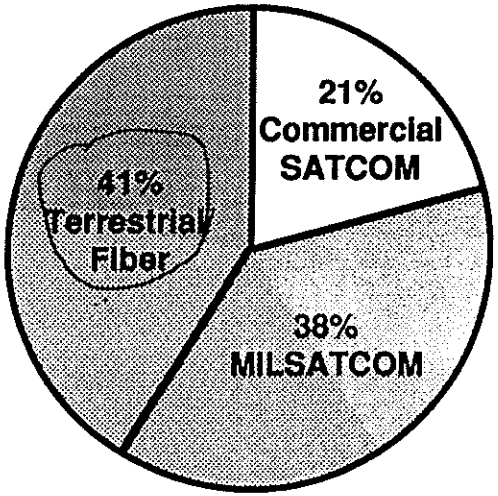


WARTIME

WARTIME REQUIREMENTS = 1061 Mbps



WARTIME REQUIREMENTS = 1061 Mbps



- Deployed Users Require SATCOM
- Deployed, Protected Users Require MILSATCOM
- Most Fixed Users Can Migrate to Terrestrial/Fiber Systems